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# *Vigna konkanensis* (Fabaceae: Papilionoideae) a new species from the west coast of India

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A new species of the genus *Vigna* Savi of the Section *Ceratotropis* namely, *Vigna konkanensis* Latha, K.V. Bhat, I.S. Bisht, Scariah, Joseph John et Krishnaraj, is described and illustrated from the west coast of India. This species is closely allied to *Vigna sublobata* and *Vigna hainiana* but differs from both in having glabrous stem, stipule, leaflets and inflorescence, acute leaflets, immature pods without a pinkish spot at the apex, mature pods with sparsely short setose hairs and seeds rough with appressed concentric reticulations on testa.

**Keywords**: Leguminosae; *Vigna konkanensis*; section *Ceratotropis*; India; new species

## Introduction

The pantropical genus *Vigna* Savi (Leguminosae: Papilionoideae) includes over 104 species (Schrire 2005; Delgado-Salinas et al. 2011). Historically, this genus has a complex taxonomy because of its relationship with *Phaseolus* (Maréchal et al. 1978; Delgado-Salinas et al. 1993, 2011). Maréchal et al. (1978) recognized seven subgenera in the genus *Vigna s.l.* : *Ceratotropis*, *Haydonia*, *Lasiospron*, *Macrorhynchus*, *Plectotropis*, *Sigmoidotropis* and *Vigna. Vigna* subg. *Macrorhynchus* is now included in *Wajira* (Thulin et al. 2004). The sub-genus *Ceratotropis* alone has its centre of diversity in Asia with 21 species (Tomooka et al. 2002).

While revising the tribe Phaseoleae for India, Babu et al. (1987) enumerated 23 species of *Vigna* including naturalized and cultivated ones. Recently, *Vigna trilobata* (L.) Verdc. var. *pusilla* Naik & Pokle was elevated to the rank of species and named *Vigna indica* T.M. Dixit et al. (Dixit et al. 2011). Aitawade et al. (2012) described a new species of *Vigna* – *Vigna sahyadriana* Aitwade et al. – from northern Western Ghats. Aitawade et al. (2012) also elevated *Vigna mungo* var. *sylvestris* Lukoki, Marechal et Otoual to specific status: *Vigna sylvestris* (Lukoki, Marechal et Otoual) Aitawade, K.V. Bhat et S.R. Yadav.

During biosystematic studies on *Vigna*, *Abelmoschus* and *Cucumis* in India, authors collected an interesting specimen of *Vigna* from Ratnagiri district of Maharashtra and careful analysis through field observations since 2000 and examination of type specimens of closely related taxa, showed that, it is an undescribed taxon with affinity to *Vigna hainiana* and *Vigna sublobata*. The new species is named after the type locality and compared with close relatives (Table 1), described and illustrated below.

## Taxonomic treatment

***Vigna konkanensis*** Latha, K.V. Bhat, I.S. Bisht, Scariah, Joseph John & Krishnaraj, **sp. nov.** Figures 1 and 2 (B, E, I, L).

### *Diagnosis*

*Vigna konkanensis* is closely allied to *V. hainiana* and *V. sublobata* and differs principally by having glabrous stem, stipule, leaflets and inflorescence (versus indumentum of various types and densities in stem, stipule, leaflets and inflorescence), acute leaflets (versus acuminate leaflets), immature pods without a pinkish spot at the apex (versus immature pods with pinkish spot at the apex), mature pods with sparsely short white setose indumentum (versus mature pods with sparsely to dense white or ferruginous indumentum) and seeds rough with appressed concentric reticulations on testa (versus seeds with projected reticulations on testa).

Type: India, Maharashtra, Ratnagiri district, 10 August 2000, K.V. *Bhat & I.S. Bisht BB 64-2000* (Holo NHCP; Iso CAL, CALI, MH, TBGT).

### *Description*

A twining annual herb, c.1.5 m high. Stem branching profusely from the base, dark green with purple coloration, glabrous. Leaves trifoliolate, shining; petiole glabrous, 6–7 cm long, greenish purple; rachis 1–1.5(-2) cm long; petiolules greenish purple, 2–3 mm long; stipules elliptic-ovate, 2–3 × 3–4 mm, sub-medifixed, prolonged above the point of insertion, acute at apex, five or six nerved, ciliate at margin, cilia brownish, 0.8–1.4 mm long. Leaflets glabrous, ovate to elliptic-lanceolate, distantly wavy at

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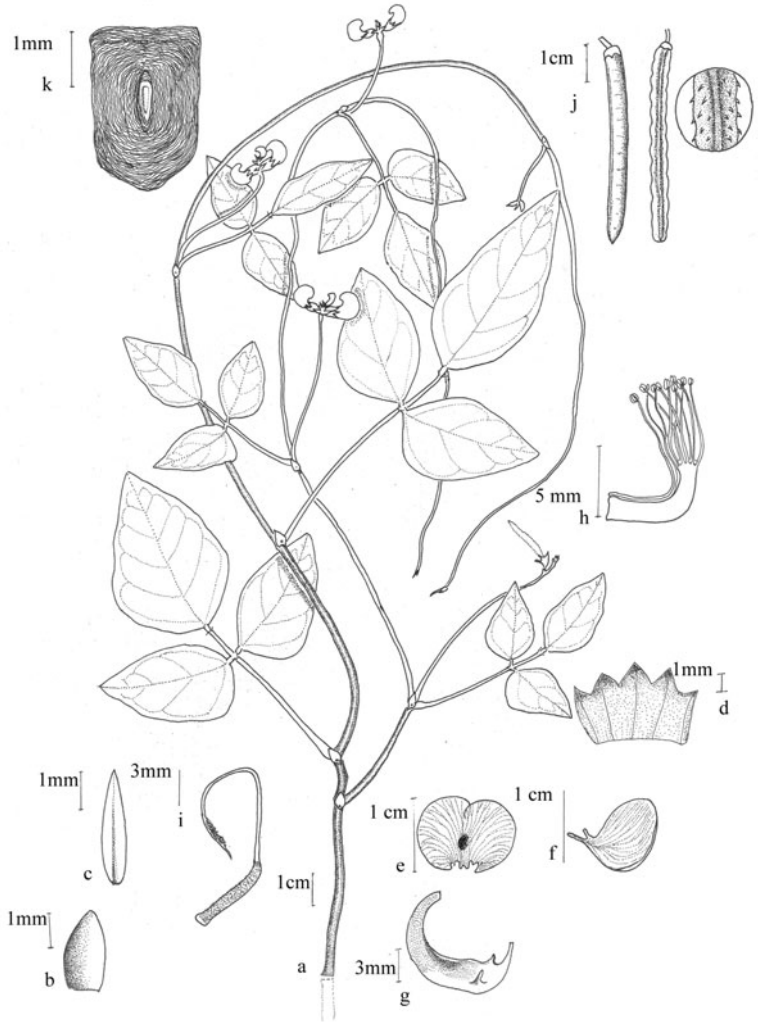


Figure 1. Illustration of *Vigna konkanensis* Latha *et al.* **(A)** Habit. **(B)** Bract. **(C)** Bracteole. **(D)** Calyx. **(E)** Standard petal. **(F)** Wing petal. **(G)** Keel petal. **(H)** Androecium. **(I)** Pistil. **(J)** Fruit. **(K)** Seed.

margin, acute at apex; terminal leaflets 8.6–9.1 × 3–4.5 cm, obtuse at base, acute at apex; lateral leaflets obliquely ovate, 3–5 × 2.5–3 cm; stipels narrowly elliptic, 2–3 mm long. Racemes axillary, glabrous, 6–10 cm long, 8–10 flowered; peduncle 6–8.5 cm long; rachis c.1 cm long with flowers crowded at apex. Bract ovate-elliptic, truncate at base, glabrous, 2–2.6 × 1.8–2.2 mm; bracteole lanceolate, 0.6–2.5 × 0.4–0.5 mm; pedicel ascending, 1–2 mm long in flower and 4–6 mm long in fruit. Calyx campanulate, purplish green; calyx tube 2–3 mm long; lobes narrowly deltoid, glabrous, c.1 × 1 mm, acute at apex. Corolla yellow. Standard broadly elliptic, 8.8–11.3 × 6–11 mm, emarginate at apex; claw c.2 mm long; appendage yellow at the centre of lamina, c.2 mm long; wing petals broadly ovate, 0.8–1 × 0.9–1 cm; claw 0.3–0.8 mm long; right wing petal concealing the keel petals, left wing petal spreading forward; keel petals spirally incurved, 1.2–1.4 × 0.3–0.4 cm; lamina with purplish coloration at middle; keel pocket 0.3 mm long. Stamens diadelphous; staminal tube c.5–7 mm long; filaments 5–6 mm long, filiform; anthers c.2 × 2 mm. Pistil 1.6–2 cm long; ovary linear, 5.5–6 × 1–1.1 mm, appressed puberulous; ovules 6–12, marginal; style filiform, 9–13 mm long, prolonged beyond stigma to form a style beak; beak slightly curved, 0.3 mm long. Pods spreading, immature ones without a pinkish spot at apex, intermediate green when young, turn to tan colour on maturity, linear, 4.5–6 × 0.4–0.5 cm, sparsely setose hairy; seeds mottled black, rectangular, rough with appressed concentric reticulations on testa, glossy, 2.5–2.8 × 2–2.2 mm; hilum linear, central 0.8–1.1 mm, convex. Germination epigeal.

*Phenology*

August–November

*Habitat*

Observed as wild in Ratnagiri district of Maharashtra.

*Distribution*

India: Maharashtra


Figure 2. Comparative morphology of *Vigna konkanensis* and allied taxa. **(A, D, G, H)** *Vigna sublobata*; **(B, E, I, L)** *Vigna konkanensis*. **(C, F, H, K)** *Vigna hainiana.*

***Key to the indigenous species of Vigna* section *Ceratotropis* in India**

1. Indumentum on stem, leaflets, stipule and inflorescence velvety or ferruginous hairy; stipule ovate; young pods with pinkish spot at apex; mature pods densely hairy; seeds with projected reticulations on testa ..... 2
Stem, leaflets, stipule and inflorescence glabrous; stipule ovate-elliptic; young pods without pinkish spot at apex; mature pods sparsely setose hairy; seeds with appressed reticulations on testa ..... ***V. konkanensis***

2. Corolla yellow, 0.4–0.6 cm long; standard petal 6–6.5 × 10.5–11 mm; keel pocket 1– 1.5 mm ..... ***V. hainiana***
Corolla greenish-yellow, 1.4–2.4 cm long; standard petal 1–1.1 × 1.8–1.9 cm; keel pocket 2–4.2 mm ..... ***V. sublobata***

3. Stipule narrow, falcate; seeds arillate ..... 4
Stipule broad, non-falcate; seeds poorly arillate or aril absent ..... 5

4. Pods 7–12 per infructescence; seeds 10–15 ..... ***V. sahyadriana***
Pods 3–8 per infructescence; seeds 9–11 .....6

5. Plants erect; seeds with thin mesh-like reticulation ..... ***V. mungo***
Plants twining; seeds with very porous or mesh-like reticulation ..... ***V. sylvestris***

6. Pods covered with white hairs at maturity ..... ***V. subramaniana***
Pods covered with ferruginous hairs at maturity ..... ***V. radiata***

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Table 1. Comparison of selected morphological characters to distinguish *Vigna konkanensis* sp. nova with closely allied *V. sublobata* and *V. hainiana*

| Sl. No. | Characters | ***V. hainiana*** Babu et al. | ***V. sublobata*** (Roxb.) Babu and S.K. Sharma | ***V. konkanensis*** Latha et al. |
|---|---|---|---|---|
| 1. | Type of seed germination | Epigeal | Epigeal | Epigeal |
| 2. | Primary leaf size (cm) | 1.4–2.9 × 0.7– 1.2 | 1– 2.5 × 0.6–1.6 | 2.1–2.6 × 1.1–1.6 |
| 3. | Indumentum on stem, leaves and inflorescence | Velvety | Densely ferruginous | Glabrous |
| 4. | Stipule | Ovate, pubescent | Ovate, pubescent | Ovate-lanceolate, glabrous |
| 5 | Petiole | 4.5–14 cm long | 6–16.6 cm long | 6.6–7.1 cm long |
| 6. | Terminal leaflet | 6–12 cm long, tip acuminate | 5.4–10 cm long, tip acuminate | 8.6–9 cm long, tip acute. |
| 7. | Days to flowering (*ex situ*) | 48–75 | 39–67 | 50–65 |
| 8. | Bracteole | Lanceolate | Ovate-lanceolate | Lanceolate |
| 9. | Corolla colour and size | Yellow, 0.4– 0.6 cm long | Greenish yellow, 1.4– 2.4 cm long | Yellow, 1.3–2.4 cm long |
| 10. | Standard petal size (mm) | 6–6.5 × 10.5–11 | 10–11 × 18–19 | 8.8–11.3 × 6–11 |
| 11. | Keel pocket (mm) | 1–1.5 | 2–4.2 | 1.5–2 |
| 12. | Ovary (mm) | 4–4.4 × 1–1.2 | 7–7.5 × 1–1.2 | 5.5–6 × 1–1.1 |
| 13. | Pods | 2–4 per infructescence, 4–4.5 × 0.3–0.35 cm, sparsely to densely covered with white hairs, pinkish spot at the apex of young pods absent | 4–8 per infructescence, 6–6.5 × 0.4– 0.5 cm, densely ferruginous hairy, pinkish spot at the apex of young pods present | 3–8 per infructescence, 4.5–6 × 0.4–0.5 cm, sparsely short setose hairy, pinkish spot at the apex of young pods absent |
| 14. | Seeds | 8–11 per pod, elliptic or round, 2–2.5 × 1.5–2 mm, with projected reticulations on testa | 10 –14 per pod, rectangular, 2.5–3.1 × 1.9–2.7 mm, rough with projected reticulations on testa | 8–9 per pod, rectangular, 2.5–2.8 × 2–2.2 mm, rough with appressed concentric reticulations on testa |
| 15. | Hilum | 0.8–1.2 mm long, convex | 1.1–2.3 mm long, concave | 0.8–1.1 mm long, convex |
| 16. | Weight of 100 seeds | 0.4–2.9 g | 0.74–1.32 g | 0.5–0.6 g |
| 17. | Seed yield per plant | 0.5–23.4 g | 15.9–68.9 g | 20.7–21.2 g |

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